

SAT Report for Case # P-18-0136

General

Report Status:	Complete	Status Date:	11/19/2018
CRSS Date:	04/23/2018	SAT Date:	04/24/2018
		SAT Chair:	Doritza Pagan-Rodriguez
Consolidated PMN?	N		
Consolidated Set:			
Submitter:			
CAS Number:			
Ecotox			
Related Cases:			
Health			
Related Cases:			
Chemical Name:			
Use:			
	All analogs are dyes for		
Trade name:	MKP 1003		
PV			
Max (kg/yr):			
Ecotox Assessor:	Kim, Anne	Fate Assessor:	
		Health Assessor:	Salazar, Keith

Physical Chemical Information

Molecular Weight:	Physical State - Neat:	Solid
Percent 500:	Percent 1000:	
Melting Point (Measured):	Melting Point (est):	MPD (EPI):
Vapor Pressure:	Vapor Pressure (est):	<0.000001 VP (EPI):
Water Solubility:	Water Solubility (EST):	Water Solubility (EPI):
Log Kow:	Log P	Log Kow (EPI):
Log P:	Comment:	

SAT Concern

Ecotox Rating (1):	Ecotox Rating Comment (1):
Ecotox Rating (2):	Ecotox Rating Comment (2):
Health Rating (1):	Health Rating Comment (1):
Health Rating (2):	Health Rating Comment (2):

PBT Ratings

Persistence	Bioaccumulation	Toxicity	Comments
3	1		

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**Exposure
Based Review
(Health)?**
**Exposure Based N
Review
(Ecotox)?**
SAT AQUATOX, IRRITATION,
Keywords: SYSTEMIC

Fate Assessment P-18-0136

Summary: FATE:

Solid

Log Kow = 1.74

(M)

S = 2.067 g/L at 25 °C (M)

VP < 1.0E-6 torr at 25 °C

(E)

BP > 400 °C (E)

H < 1.00E-8 (E)

POTW removal (%) =

0-25 via sorpton; Analog

OECD

301B(Mod Sturm CO2 ev): 2-3%/28d NRB.

Time for complete ultimate

aerobic biodeg > mo

Sorption to soils/sediments = low -

moderate

PBT Potential: P3B1

*CEB FATE: Migration to ground water =

moderate - rapid

Bioconcentration factor to be put into E-FAST:

3

PMN Material:

Overall wastewater treatment removal is 0-25%

based on low biodegradability, low sorption and low stripping.

Sorption to sludge is low based on the measured octanol-water partition coefficient that was submitted for the PMN and analogous chemicals.

Air Stripping (Volatilization to air) is negligible based on high molecular volume and analogous chemicals.

Removal by

biodegradation in wastewater treatment is negligible based on analog data

(Mod Sturm CO2 ev): 6%/28d).

The aerobic aquatic biodegradation half-life is greater than months based on analog data [REDACTED]

The anaerobic aquatic biodegradation half-life is greater than months based on the aerobic biodegradation half-life. The anaerobic biodegradation half-life is greater than or equal to the aerobic biodegradation half-life.

Sorption to soil and sediment is low

to moderate based on the measured octanol-water partition coefficient that was submitted for the PMN and analogous chemicals.

Migration to

groundwater is moderate to rapid based on the measured octanol-water partition coefficient that was submitted for the PMN and analogous chemicals.

PMN Material:

High Persistence (P3) is based on the aerobic and anaerobic biodegradation half-life.

Moderate

Bioaccumulation potential (B1) is based on high molecular volume and analogous chemicals.

Note: [REDACTED] were used in the assessment of the PMN. There were hydrolysis data submitted for the analogs [REDACTED] which indicated greater than a year for the hydrolysis half-life.

Bioconcentration/Bioaccumulation factor to be put into E-Fast: 3.

**Removal0-25
in WWT/POTW
(Overall):**

Condition	Rating Values	Comment
	w/ Rating Description	
WWT/POTW	1	
Sorption:		
WWT/POTW	4	
Stripping:		
Biodegradation	4	
Removal:		
Biodegradation		
Destruction:	4	

Condition	Rating Values	Comment
	w/ Rating Description	
Aerobic Biodeg Ult:		
Aerobic Biodeg Prim:		
Anaerobic Biodeg Ult:	4	
Anaerobic Biodeg Prim:		
Hydrolysis (t1/2 at pH 7,25C) A:		
Hydrolysis (t1/2 at pH 7,25C) B:		
Sorption to Soils/Sediments:	3-4	
Migration to Ground Water:	3-4	
Photolysis A, Direct:		
Photolysis B, Indirect:		
Atmospheric Ox A, OH:		
Atmospheric Ox B, O3:		

Health Assessment

Health Summary: Absorption is expected to be nil through the skin (pchem), and poor to nil through the GI tract and lungs (pchem and submitted data) .

There is concern for systemic toxicity from repeated exposures to the PMN substance's anion based on moderate acute toxicity observed in submitted analog data. There is concern for irritation to all exposed tissues (skin, eyes, mucous membranes, GI tract, lungs) for the cation based on data submitted with [REDACTED]

Routes of Exposure: Dermal , Oral, Inhalation

Test Data Submitted

Test Data Submitted

Submitted: test data for PMN and analog (analog is not a good analog for the LVE's cation)

- OECD TG 471 Bacterial reverse mutation test: not mutagenic (analog).
- OECD TG 474 Mammalian micronucleus test: no significant increase in micronucleated polychromatic erythrocytes. Non clastogenic. (analog) .
- LLNA negative (analog) .
- OECD TG 404 Acute Dermal: no irritating or corrosive effects in rabbits (PMN)
- OECD TG 437 Bovine Corneal Opacity test: inconclusive; clouding of tissue (PMN)
- OECD TG 439 In vitro skin irritation in reconstructed human epidermis: inconclusive; test substance not compatible with test (PMN)
- OECD 423 Acute Oral: LD50 > 300 and < 2000 mg/kg (analog).

Data submitted with [REDACTED]

negative in
Salmoella, E. coli, and mouse micronucleous assay
Not a dermal
sensitizer in guinea pigs
LC50 > 2.57 mg/l in rats; irregular
respiration observed.
LC50 > 2.58 mg/l in rats (analog data)

Irritating to rabbit skin
Dermal LD50 > 250 mg/kg in rabbits; no
mortality; reversible skin irritation observed.
acute dermal toxicity
study - Severe toxicity (such as distress) and mortality observed at 1000
and 2000 mg/kg. NOAEL was not determined.
acute dermaltoxicity/
irritation - Mortality and skin necrosis observed at 500 mg/kg. No
effects observed at 250 mg/kg.
Oral LD50 550 mg/kg in female rats;
(1/4 and 3/3 rats died at 550 and 2000 mg/kg, respectively).
5-d oral
study - 2/6 female and 1/6 male rats died after treatment with 1000 mg/kg
undiluted. Clinical signs (such as burrowing, salivation, ptosis,
piloerection, wobbly gait, tremors, twitching, and convulsions) were
observed in animals treated with 1000 mg/kg of the diluted test material.

18-d oral No effects were observed in treatment groups, except for transient clinical signs (wobbly gait, passivity, tremors) in the high dose group (1000 mg/kg) during days 1-2 of treatment.

28-d oral- NOAEL

= 500 mg/kg based on hyperemia in the glandular portion of the stomach observed in animals from the 1000 mg/kg group. Clinical signs were observed in all treated animals, but were attributed to irritation because the neurological assessment was unremarkable.

Notes:

1- The

PMN is categorized as a cationic surfactant for ecotoxicity; but in regards to human health hazards, the LVE is not expected interfere with lung surfactants based on its water solubility.

2- See Human health

Form A for further discussion of endpoints of concerns and evaluation of analog data (i.e., Human health form may contain other analogs [i.e., worst-case analogs] with quantitative data).

**Ecotox
Assessment**

Test organism	Test Type	Test Endpoint	Predicted	Measured	Comments
Fish	96-h	LC50	>43		P: Analogue: [REDACTED]
Daphnid	48-h	LC50	2.8	1.93	[REDACTED] P: Analogue: [REDACTED] M: [REDACTED] PMN
Green Algae	96-h	EC50	1.2		P: Analogue: [REDACTED] [REDACTED]
Fish	-	Chronic Value	>4.3		P: [REDACTED] [REDACTED]
Daphnid	-	Chronic Value	0.28	0.193	P: ACR 1 [REDACTED] [REDACTED] M: [REDACTED]
Green Algae	-	Chronic Value	<0.21		P: [REDACTED] Analog: [REDACTED] [REDACTED]

Factors	Most Sensitive Endpoint	Assessment Factor	CoC	Comment
Acute Aquatic:	1200	4	300	Algal EC50
Chronic Aquatic:	193	10	19	Daphnid ChV

Ecotox Route of Exposure?	All releases to water
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Factors	Values	Comments
SARs:	Anionic Dyes and Cationic Surfactants	
SAR Class:	[REDACTED]	
TSCA NCC Category?	Acid Dyes and Amphoteric Dyes	

Recommended Testing

Potentially Useful

Information: None

Ecotox Value

Comments

Predictions are based on data for the PMN substance and analogue [REDACTED] Log Kow = 1.74 (M); solid with an unknown MP (P); S = 2067 mg/L (M); effective concentrations based on 100% active ingredients and mean measured concentrations; hardness <150 mg/L as CaCO₃; and TOC <2.0 mg/L.

Ecotoxicity Test Data Results

Case Number: P-18-0136

Chemical

[REDACTED]

Trade

Name: MKP 1003

Initial Data Review

Invertebrate Ecotoxicity

Test:

Eurofins Agrosience Services EcoChem/Ecotox GmbH conducted a 48-hour acute toxicity test in the water flea (*Daphnia magna*) with P-18-0136 (purity not stated; [REDACTED]) under semi-static conditions with 24-hour renewal. The water solubility of the test item was reported to be 206.7 mg/L. This study followed OECD test guideline No. 202 (2004). Following a range-finding test, four replicates of five *D. magna* were exposed to a dilution water control (Elendt M4 medium) or the test substance at nominal concentrations of 0, 0.427, 0.939, 2.07, 4.55, and 10 mg/L. Corresponding mean measured test concentrations (calculated as the geometric mean of the sum of the [REDACTED]) were 0.307, 0.657, 1.47, 3.46, and 6.80 mg/L (68-76% of nominal), as determined by HPLC-MS/MS analysis, (LOQ = 0.07 mg/L). To prepare the test solutions, a stock solution (10 mg/L) was prepared by adding an appropriate amount of test item to a volumetric flask, adding dilution water, and stirring/homogenizing for 120 minutes. The solution was allowed to settle for 5 minutes following the stirring period. Following this period, the solution was rose-colored and fine particles of substance were visible. Test solutions at the remaining nominal test concentrations were prepared by dilution of the appropriate test solutions. At concentrations of ≥ 0.939 mg/L, daphnids were observed to be collocated. Flakes of test substance were observed at the bottom of the test vessel in the 4.55 and 10 mg/L test

solutions at 24 and 48 hours. Over the course of the study, temperature ranged from 19.7-21.0°C, pH ranged from 7.76-8.15, and dissolved oxygen ranged from 8.7-9.1 mg/L. Dilution water hardness was 214 mg/L as CaCO₃. A loading rate of 100 daphnids/L was calculated. Percent immobility at concentrations of 0 (control), 0.427, 0.939, 2.07, 4.55, and 10 mg/L was 0%, 5%, 30%, 35%, 70%, and 95%, respectively. Based on mean measured concentrations, the 48-hour EC₅₀ was 1.93 mg/L.

48-hour EC₅₀ = 1.93 mg/L

The test substance information

and study summaries below are for an analogous chemical, not the actual PMN substance. Although not specified by the submitter, the tested substance is the same as PMN substance [REDACTED]

Chemical Name:

[REDACTED]

Fish Ecotoxicity Test:

Institute

of Pesticide and Environmental Toxicology, Zhejiang University (China) conducted a 96-hour acute toxicity test in zebrafish (*Brachydanio rerio*) with the analog test substance (purity: >99%) under static conditions. This study followed OECD test guideline No. 203 (1992). The test substance was not completely soluble in test medium at the concentrations tested. Single replicates of ten *B. rerio* were exposed to a dilution water control (dechlorinated tap water) or a filtered test solution prepared at a loading rate of 100 mg/L. The corresponding mean measured test concentration was 42.88 mg/L, as determined by HPLC analysis with UV/VIS detection, (LOD = 0.1 mg/L). To prepare the test solution, 1000 mg of test item was added to 10 L of dilution water. After stirring for 8 hours, the mixture was filtrated with qualitative filter paper to remove undissolved test substance particles. Over the course of the study, temperature ranged from 23.2-24.6°C, pH ranged from 5.76-6.42, and dissolved oxygen ranged from 6.44-7.25 mg/L. Dilution water hardness was 60-80 mg/L as CaCO₃. A biomass loading rate of 0.18 g fish/L was calculated. No mortalities or observable symptoms occurred in the control or test group. Based on mean measured concentrations, the 96-hour LC₅₀ was > 42.88 mg/L.

96-hour LC₅₀

> 42.88 mg/L

Algal Ecotoxicity Test:

NOTOX B.V. conducted a 72-hour

acute toxicity test in green algae (*Pseudokirchneriella subcapitata*) with the analog test substance (purity: >95%) under static conditions. The water solubility of the two anions was determined to be 412 mg/L and 73 mg/L, respectively. The test substance was not completely soluble in test medium at a loading rate of 100 mg/L. This study followed OECD test guideline No. 201 (2006), EEC directive 92/69, Part C (1992), ISO International Standard 8692 (2004), and OECD test guideline No. 23 (2000). Following a range-finding test, three replicates of *P. subcapitata* (1×10^4 cells/mL) were exposed to test substance concentrations of 0.32, 1, 3.2, 10, 32, or 100% of a water soluble fraction (WSF) prepared at a nominal loading rate of 100 mg test item/L. Additionally, six control replicates of *P. subcapitata* were exposed to dilution water only (M2 medium). Test substance measurements were performed for the cation and two anionic parts (peaks 1 and 2) of the test substance via HPLC analysis (LOD = 0.19-0.28 mg/L). Mean measured test substance concentrations ranged from 99-124% of nominal based on the cation, 101-124% of nominal based on anionic peak 1, and 25-93% of nominal based on anionic peak 2. Test substance concentrations based on the anionic peak 2 were significantly lower at the start of the test and, especially at the lower concentrations, did not remain stable. Taking the worst case scenario into account, effect parameters were based on the average exposure concentrations of test substance based on anionic part peak 2 (<LOQ, <LOQ, 0.21, 0.86, 5.4, and 23 mg/L in the 0.32, 1, 3.2, 10, 32, and 100% WSFs, respectively). The algal cultures were illuminated with a light intensity of 110-115 $\mu\text{E}/\text{m}^2/\text{s}$, with constant shaking. A loading rate of 100 mg/L was first prepared by applying a 15-minute treatment of ultrasonic waves, followed by 30-35 minutes of magnetic stirring to obtain maximum solubility in the test medium. Subsequently, this mixture was left to stabilize for 2.0-2.25 hours, after which the water soluble fraction (WSF) was siphoned off. The WSF prepared for the final test was left to stabilize for another 30 minutes and a second WSF was siphoned off because very small particles were observed in the first one. The lower test concentrations were prepared by subsequent dilutions of the WSF in test medium. The final test solutions were all clear and ranged from colorless to dark pink. Over the course of the study, temperature ranged from 21.9-23.1°C and pH ranged from 7.9-8.3. Dilution water hardness was 24 mg/L as CaCO_3 . The mean cell density of control cultures increased by a factor of 328.5 within 72 hours. Based on mean measured concentrations (of the anionic peak 2), the 72-hour EC₅₀ for growth rate was 12 mg/L. The 72-hour NOEC and LOEC values for growth rate were 0.21 mg/L and 0.86 mg/L, respectively; the calculated ChV was 0.42 mg/L. The 72-hour EC₅₀ for yield was 1.2 mg/L. The 72-hour NOEC and LOEC values for yield were <0.21 mg/L and 0.21 mg/L, respectively.

72-hour EC₅₀ (growth rate) = 12 mg/L

72-hour NOEC (growth rate) = 0.21 mg/L

72-hour LOEC (growth rate) = 0.86 mg/L

72-hour ChV
(growth rate) = 0.42 mg/L

72-hour EC50 (yield) = 1.2 mg/L

72-hour

NOEC (yield) < 0.21 mg/L

72-hour LOEC (yield) = 0.21 mg/L

[REDACTED] submitted three toxicity studies on P-18-0136. The daphnia study was on the PMN, and fish and algal studies were on an analogous chemical [REDACTED] (the tested substance is the same as PMN substance. These studies were considered to be acceptable for the purposes of the acute and chronic concentration of concern (COC) determination.

Based on submitted experimental data on P-18-0136 and its analogue, the acute COC for P-18-0136 is 300 ppb (1200 ppb / 4 (uncertainty factor)) for algae. The chronic COC for P-18-0136 is 19 ppb (193 ppb / 10 (uncertainty factor)), based on the submitted test data for daphnia.

Acute COC = 300 ppb

Chronic COC = 19
ppb

Ecotox Reviewer: A. Kim
Date: 4/25/2018

Ecotox

Factors Comments

Environmental Hazard: Environmental hazard is relevant to whether a new chemical substance is likely to present unreasonable risks because the significance of the risk is dependent upon both the hazard (or toxicity) of the chemical substance and the extent of exposure to the substance. EPA estimated environmental hazard of this new chemical substance using hazard data for the new chemical substance and hazard data on analogous chemical [REDACTED]. Substance falls within the TSCA New Chemicals Category of Acid Dyes and Amphoteric Dyes. Acute toxicity values estimated for fish, aquatic invertebrates, and algae are >43 mg/L (analogue data), 1.93 mg/L (PMN data), and 1.2 mg/L (analogue data), respectively. Chronic toxicity values estimated for fish, aquatic invertebrates, and algae are >4.3 mg/L (using ACR 10 of analogue), 0.193 mg/L (using ACR 10 of PMN), and <0.21 mg/L (analogue data), respectively. These toxicity values indicate that the new chemical substance is expected to have moderate environmental hazard. Application of assessment factors of 4 and 10 to acute and chronic toxicity values, respectively, results in acute and chronic concentrations of concern of 0.300 mg/L (300 ppb) and 0.019

mg/L (19 ppb), respectively.

Environmental Risk: Risks to the environment were evaluated by comparing estimated surface water concentrations with the acute and chronic concentrations of concern. Risks to the environment were not identified due to no releases to water.